Road & Bridge Design Publications

Monthly Update – January 2021

Revisions for the month of **January** are listed and displayed below and will be included in projects submitted for the **May** letting. The special detail index from **October** will remain in effect. E-mail road related questions on these changes to MDOT-Road-Design-Standards@michigan.gov. E-mail bridge related questions to MDOT-Bridge-Design-Standards@michigan.gov.

Road Design Manual

1.03.03: Contract Time Determination: Eliminated the former section "Critical Path Method (CPM)" which was outdated and replaced it with, "Contract Time Determination". This section is a single sentence with a link to the Contract Time Determination Guidance website.

5.05.02: Consent to Construct Sidewalk: Added a paragraph regarding Right-of-Way purchases, project scope, and sidewalk construction/ADA compliance.

5.17: Base Plans & 5.19: Preliminary Plans: Revised the responsibility for notifying the appropriate review groups of upcoming meetings from the Region Project Development Engineer to the Project Manager.

14.49: Critical Path Networks: Deleted section due to duplication of coverage in Chapter 1.

Appendix B of Chapter 14: Critical Path Construction Time Estimates: Eliminated Appendix B based on the revisions in section 1.03.03.

Bridge Design Manual

7.02.19 I. (LFD & LRFD): New Section for Link Slabs. See also Bridge Design Guides 6.44.01 & 6.44.01A.

Bridge Design Guides

Table of Contents, 6.44.01 & 6.44.01A: New guides for link slabs. See Section 7.02.19 I. of the Bridge Design Manual.

6.60.11A: Updated sawed joint plan note.

Updates to the MDOT Cell Library, Sample Plans, and other automated tools may be required in tandem with some of this month's updates. Until such updates can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

CHAPTER 1 PLAN PREPARATION INDEX (continued)

1.03.03 (revised 1-25-2021)

Contract Time Determination (CTD)

Refer to the Department's Construction Scheduling Website.

1.03.04 (revised 10-22-2012)

Roadway Cross Sections

Roadway cross sections are very valuable to the designer. They are one of the main items used to design the project. Cross sections are used by the designer to visualize what the roadway will look like in the field.

Roadway cross sections show the existing roadway conditions. They are used to determine earthwork, draw slope stake lines, determine right of way needs, fit proposed to existing, determine driveway and crossroad grades, determine clearing and removal limits, determine drainage requirements, set front and back slopes, and determine much more information needed to design the project.

Cross sections should be plotted for all projects with grade and slope changes. Exaggerated cross sections can be very helpful in setting curb grades on urban projects.

The roadway cross sections are not included in the plans but should be sent to the project engineer before the project is under construction. The sections can be very informative to the construction personnel and, many times, help to explain the design shown on the plans.

5.05

URBAN R.O.W.

Where all or portions of a project are located in urban areas, R.O.W. may be limited to the width determined by municipal planning or to existing R.O.W. Portions within urban boundaries that have never been developed should be set up the same as for rural projects. Occasionally, because of the increased width of the proposed surface, additional R.O.W. is needed. In this case the new width is determined by the Department, and the designer should become familiar with whatever agreements or decisions are made.

5.05.01 (revised 9-28-2020)

Urban Expressways

R.O.W is of primary importance in urban expressway design. Modern expressways are designed to provide roadways of sufficient width to carry large volumes of traffic frequently including frontage roads and access ramps, requiring R.O.W. widths of 300' to 400'. Obviously, a strip of land of this width cutting across a city is very costly and disruptive, and the work involved in securing the necessary properties requires a lot of time. Construction that is slowed by R.O.W. acquisition may further be delayed by the moving and razing of many buildings. Base Plans (Preliminary R.O.W.), although not exact and thus subject to revision, should be placed on file in the city's offices and used as a criterion for the issuing of building permits in areas where construction is planned in the near future.

5.05.02 (revised 1-25-2021)

Consent to Construct Sidewalk

Whenever feasible, new or reconstructed sidewalk should be placed 1 foot minimum inside the existing or proposed R.O.W. line (as determined by a Professional Surveyor). When the proposed sidewalk grading limits extend outside the R.O.W., a Consent to Construct Sidewalk (Form 0640C) is requested. The consent obtains permission from the adjacent property owner to temporarily utilize their property to construct new and/or to replace existing sidewalks within the existing or proposed R.O.W. See application #3 on the following page for proposed sidewalk remaining outside the R.O.W. Show slope stake lines to determine the impact to the property.

The Real Estate Services Section of the Development Services Division or Region Real Estate will determine just compensation for the Consent which is offered to the property owner. Consent is noted at each applicable location as:

Consent to Construct Sidewalk

Listed below are several applications for use of the Consent to Construct Sidewalk and options in the event of failure to obtain consent or fee/easement. Gapping out sidewalk construction in areas with consent or fee/easement conflicts is not an acceptable option. Sidewalk accessibility must be provided for persons with disabilities according to the Americans with Disability Act (ADA) of 1990. When constructing sidewalk, the Department is responsible for meeting ADA accessibility requirements for the public sidewalk. The area outside these limits may require restoration of existing private connection to the sidewalk. Regardless of whether or not consent is granted, accessibility impact should be discussed with the property owner during negotiations.

5.05.02 (continued)

Consent to Construct Sidewalk

If ROW is not in the scope of the road/bridge project, then it would not be required for the project solely for ADA compliance and a Consent to Construct Sidewalk will be needed to transition to the existing sidewalk. If the scope of the road/bridge project does include ROW and/or there is planned accessible path where constructing sidewalks are within the scope (more than just ramps), then ROW would need to be purchased for the sidewalk ramp transitions, including condemnation, if necessary.

See Section 6.08.06 for information on accessibility requirements for private connections to sidewalks.

1. **Existing sidewalk extends to the face of buildings** - In the downtown business districts, many businesses are on the R.O.W. line or just beyond the R.O.W. line. If the existing sidewalk is being reconstructed to the face of a building, obtain the Consent to Construct Sidewalk. No fee/easement would be required if the pedestrian travel zone of the sidewalk is within the existing R.O.W. The consent requested would include construction of the sidewalk frontage zone located outside the existing R.O.W. to add aesthetic value to the business property. If the consent is not granted, MDOT may elect to delete the parcel and construct the sidewalk to the R.O.W. line leaving the remaining portion of old sidewalk to the face of the building with consideration for accessibility as previously stated.

5.05.02 (continued)

2. **Existing sidewalk to be replaced in existing R.O.W., but grading is needed outside existing R.O.W**.- Many communities have the existing sidewalks constructed one foot inside the R.O.W. line. If the proposed sidewalk requires a slope stake line outside the existing R.O.W., obtain the Consent to Construct Sidewalk. This consent allows for reconstructing the sidewalk within the existing R.O.W. and placing fill material and/or excavating the back slope on the private property to construct the sidewalk to the proper line and grade. If the consent to construct sidewalk is refused during negotiations, MDOT may elect to delete the parcel and build retaining walls with possible fencing or guardrail to keep the sidewalk and associated grading within the R.O.W. with consideration for accessibility as previously stated. If construction of the sidewalk cannot be accommodated within the existing R.O.W. or by consent, MDOT may be required to condemn for either the consent to construct sidewalk or a fee/easement in order to construct the new sidewalk.

5.05.02 (continued)

Consent to Construct Sidewalk

3. **Sidewalk Partially Outside R.O.W.** - When a slope stake line falls within any portion of an existing sidewalk that is either outside or partially outside the R.O.W., obtain a Consent to Construct Sidewalk. The consent allows for reconstructing a new sidewalk within the existing R.O.W. and removing that portion of existing sidewalk outside the existing R.O.W.

   If a proposed new or reconstructed continuous sidewalk is to remain partially outside the R.O.W., MDOT shall determine ownership prior to proceeding. If the property is within the municipality owned R.O.W., MDOT should obtain permission either via Permit or Consent from the municipality. If MDOT obtains a Consent, the parcel should be included in the R.O.W. Certification. If the property is not owned by the municipality, MDOT should acquire permanent fee/easement R.O.W. for the sidewalk remaining outside the existing R.O.W. Although MDOT is not responsible for the future maintenance or repair of the sidewalk, the fee/easement acquisition ensures the preservation of a sidewalk width compliant with ADA requirements. If MDOT is not able to acquire permanent fee/easement R.O.W., a Consent to Construct Sidewalk can be acquired.

   For tying in short intermittent alterations to existing sidewalk outside the R.O.W. *see #5.*

   If the fee/easement or consent is refused by the property owner, MDOT may elect to delete the parcel, remove and replace that portion of the sidewalk within the R.O.W. and build retaining walls with possible fencing or guardrail to keep the sidewalk and associated grading within the R.O.W. As previously stated, accessibility impacts should be addressed during negotiations with the property owner.

5.05.02 (continued)

   If construction of the sidewalk cannot be accommodated within the existing R.O.W., MDOT may be required to condemn for either the consent to construct sidewalk or fee/easement in order to construct the new sidewalk.

4. **Constructing Sidewalk Outside Existing R.O.W.** - When sidewalk is constructed or reconstructed outside the existing R.O.W. MDOT shall determine ownership prior to proceeding. If the property is within the municipality owned R.O.W., MDOT should obtain permission either via Permit or Consent from the municipality. If MDOT obtains a Consent, the parcel should be included in the R.O.W. Certification. If the property is not owned by the municipality, MDOT should acquire permanent fee/easement R.O.W. to construct the sidewalk outside the existing R.O.W. If MDOT is not able to acquire permanent fee/easement R.O.W., a Consent to Construct Sidewalk can be acquired. Failure to obtain the permanent R.OW. or a consent during negotiations may require MDOT to condemn for permanent R.O.W. to replace the sidewalk. Whenever feasible, sidewalk should be constructed or reconstructed one foot minimum inside the existing/proposed R.O.W. (as determined by a Professional Surveyor).

   See Section 6.08.01 for the Department's position on sidewalk liability and maintenance agreements.

   When the adjacent property is subject to Section 4(f) of the U. S. Department of Transportation Act of 1966, permanent easement or fee R.O.W. is usually not feasible. Consent to construct sidewalk should be pursued under these conditions.

5.05.02 (continued)

Consent to Construct Sidewalk

5. **Tying to Existing Sidewalk** – When intermittent sidewalk construction such as sidewalk ramp upgrading or driveway construction is not done in conjunction with construction or reconstruction of the continuous sidewalk, the instrument used to access private property will depend on the proposed placement of the altered section of sidewalk. Consent to construct sidewalk can be used to tie in to existing sidewalk outside the right of way if the sidewalk is not realigned or widened outside the right of way. In other words, there is no further increase to existing encroachment. If the sidewalk alignment or width is altered causing further encroachment outside the right of way, a permanent easement is required.

   The Project Manager should seek local government support for the project, utilizing Context Sensitive Design concepts. Local agencies can provide valuable assistance by holding public meetings to seek input from the community, of which, impacted property owners are primary stakeholders. This "input" process may help alleviate many disagreements and allow all stakeholders to reach consensus prior to any acquisition or consent activity. If local officials are very supportive of the project, many times they talk directly with the affected owners to secure agreement for a certain design of the sidewalks. It is required that MDOT obtain an agreement for the local agency's acceptance of responsibility for maintenance of the sidewalk.

5.05.02 (continued)

Any property needed outside the existing R.O.W. should be acquired by MDOT in order for timely acquisition of the R.O.W. needs. In the event that the property owner fails to sign a Consent to Construct Sidewalk, the plans should be revised according to the different scenarios above or Region Real Estate and Real Estate Services Section initiates the condemnation process prior to letting the plans.

5.17 (revised 1-25-2021)

BASE PLANS (PRELIMINARY R.O.W.)

The Base Plans (Preliminary R.O.W.) submittal should be submitted based upon the approved dates established by the Planisware network for the project. Project Managers must meet this date and are encouraged to submit the Preliminary R.O.W. earlier if possible.

The Project Manager will notify the appropriate review groups via ProjectWise email notification of the Base Plan Review meeting with ProjectWise links to the signed 0303 Design form and submitted Base Plans (Preliminary R.O.W. Plans). The review groups will review the Base Plans (Preliminary R.O.W. Plans) and all review comments are collected by the Project Manager. After the Base Plan Review meeting has occurred, any review comments that require changes to the Base Plans (Preliminary R.O.W. Plans) will be incorporated into the development of the Preliminary Plans (Final R.O.W. Plans). Any R.O.W. or Design revisions that occur after the Plan Review meeting and submission of the Preliminary (Final R.O.W. Plans) will be documented by using the 0303 Design Form and follow the Revision process.

The Design Plan Submittal memorandum (0303 Design Form) contains Design and Real Estate information. The 0303 contains the following information along with additional information:

A. Control section and job number

B. Location

C. Environmental Classification (and date of determination), if available.

D. Anticipated R.O.W. Certification date

E. A general description of the R.O.W. needed to construct the project, i.e., proposed R.O.W. consists of limited access R.O.W. for relocated interchange ramp.

5.18 (revised 1-29-2018)

REQUIREMENTS FOR BASE PLANS (PRELIMINARY R.O.W.)

The Base Plans (Preliminary R.O.W.) should include the following:

1. See Chapter 1 and the Road Sample Plans for guidance regarding plan sheet creation.

2. Design Plan Submittal Form 0303.
   - Distribute plans and memos as per the distribution list.

3. Consultants are also required to submit both the CADD and PDF files to the Project Manager through ProjectWise utilizing MDOT's standard system format.

The following items are not required but if available should be sent as part of the Base Plans (Preliminary R.O.W.) submittal:

Survey notes with property ties and government corners, vicinity map depicting the location of the various proposed R.O.W., and existing and proposed typical cross sections.

5.19 (revised 1-25-2021)

PRELIMINARY PLANS (FINAL R.O.W.)

When the design plans are at a point where the final slope stake and construction limits have been identified (roughly 50% complete), Preliminary Plans (Final R.O.W.) should be submitted showing final R.O.W. requirements. On large projects it may be desirable to have an informal plan review with representatives from the Environmental Section, Real Estate Services Section, Region Real Estate Agent and the Design R.O.W. Engineer prior to the Plan Review meeting. This may help to avoid future R.O.W. revisions and ensure that Real Estate is receiving all of the information it needs. The R.O.W. necessary for the proposed project is outlined on Form 0303.

The Project Manager will notify the appropriate review groups via ProjectWise email notification of the Plan Review meeting with ProjectWise links to the signed Form 0303 and submitted Preliminary Plans (Final R.O.W.). The review groups will review the Preliminary Plans (Final R.O.W.) and all review comments are collected by the Project Manager. After the Plan Review meeting has occurred, any review comments that require changes to the Preliminary Plans (Final R.O.W.) will be incorporated into the development of the Final Plans (Plan Completion). Any R.O.W. or Design revision after the submittal of the Preliminary Plans (Final R.O.W.) will follow the process in Section 5.21.

5.20 (revised 1-29-2018)

REQUIREMENTS FOR PRELIMINARY PLANS (FINAL R.O.W.)

In addition to the requirements for Base Plans (Preliminary R.O.W.), the following information is needed for Preliminary Plans (Final R.O.W.):

1. See Chapter 1 and the Road Sample Plans for guidance regarding plan sheet creation.

R.O.W. revisions can be used to modify the Final R.O.W. submittal as requested by the Designer or Region Real Estate. Designers should make determining R.O.W. needs a priority in the Design Process.

CHAPTER 14 PROCEDURES FOR PLAN PREPARATION INDEX (continued)

CHAPTER 14 PROCEDURES FOR PLAN PREPARATION INDEX (continued)

14.49

Section deleted.

14.50 (revised 12-17-2018)

FINAL CONSTRUCTABILITY REVIEW
(PPD Task Description 3860)

Once the revisions from The Plan Review Meeting have been incorporated into the plans, Final Plans begin. After the final maintaining traffic special provision has been received, and staging typicals and/or plan sheets have been completed, this information plus any unique special provisions should be sent to the Resident/Delivery Engineer for review. Discussions concerning a Construction Critical Path Network, if applicable, should also occur at this stage. In conjunction with the Constructability Review Checklist (Form 1960) for the Project Development/Design Phase, the work in this task must be addressed prior to the distribution of the final plan/proposal package for the FPC Meeting.

The final constructability review applies to all projects. On small projects this task may consist of only the transmittal of plans to the Resident or Delivery Engineer for comment. On large projects with complex staging, one or more meetings with the Resident/Delivery Engineer and Region/TSC Traffic and Safety Engineer may be required throughout this task. For projects in templates that do not require an FPC Meeting, the Final Constructability Review must be completed prior to Plan Completion.

7.02.19 (continued)

Slabs

I. Link Slabs (1-25-2021)

Design Requirements and Considerations

Link slabs may be used to eliminate deck joints at piers. A link slab is comprised of a reinforced concrete deck with a length that includes 7.5% of each adjacent span, not necessarily the same length for each span. Saw cut lines are located at centerline of pier and at 5% of link slab length in each individual span. Link slabs are not designed to transmit live load effects from one span to another. As a result, the bridge (beams) is analyzed as simply supported spans for all vertical loads. Thus, shear stud connectors shall be omitted within the limits of the link slab and a 0.31 LBS/SFT roofing paper bond breaker is applied between the top flange and the link slab to prevent composite action. The total number of shear stud connectors per span required to meet strength requirements shall still be provided. If required, increase deck removal limits to permit placement of additional shear developers beyond the link slab. The link slab reinforcing is replaced (transverse) and lapped with existing reinforcement (longitudinal) to minimize crack widths based on the anticipated strains due to live load rotations for a girder.

While the changes to the live load and dead load effects from link slabs are usually not significant, changing the articulation of the superstructure may significantly change the thermal and braking loads on the bearings, piers, and abutments. Evaluate the bearings, substructures, or foundations to determine if they can accommodate the new force configurations. It may be necessary to convert fixed bearings to expansion, increase capacity of expansion bearings and replace fixed bearings to increase capacity for longitudinal forces, etc. of the spans being linked together. Evaluate existing substructure elements in accordance with the load requirements of the AASHTO bridge design specifications in effect when the bridge was built.

7.02.19 (continued)

MDOT link slabs are designed using the following maximum bridge lengths and widths criteria:

1. Straight, no skew concrete bridge:
   Length ≤ 300 ft.

2. 45˚ max. skew concrete bridge:
   Length ≤ 200 ft., Width ≤ 100 ft.

3. Straight, no skew steel bridge:
   Length ≤ 275 ft.

4. 45˚ max. skew steel bridge:
   Length ≤ 175 ft., Width ≤ 100 ft.

See Bridge Design Guides 6.44.01, & 01A.

7.02.19 (continued)

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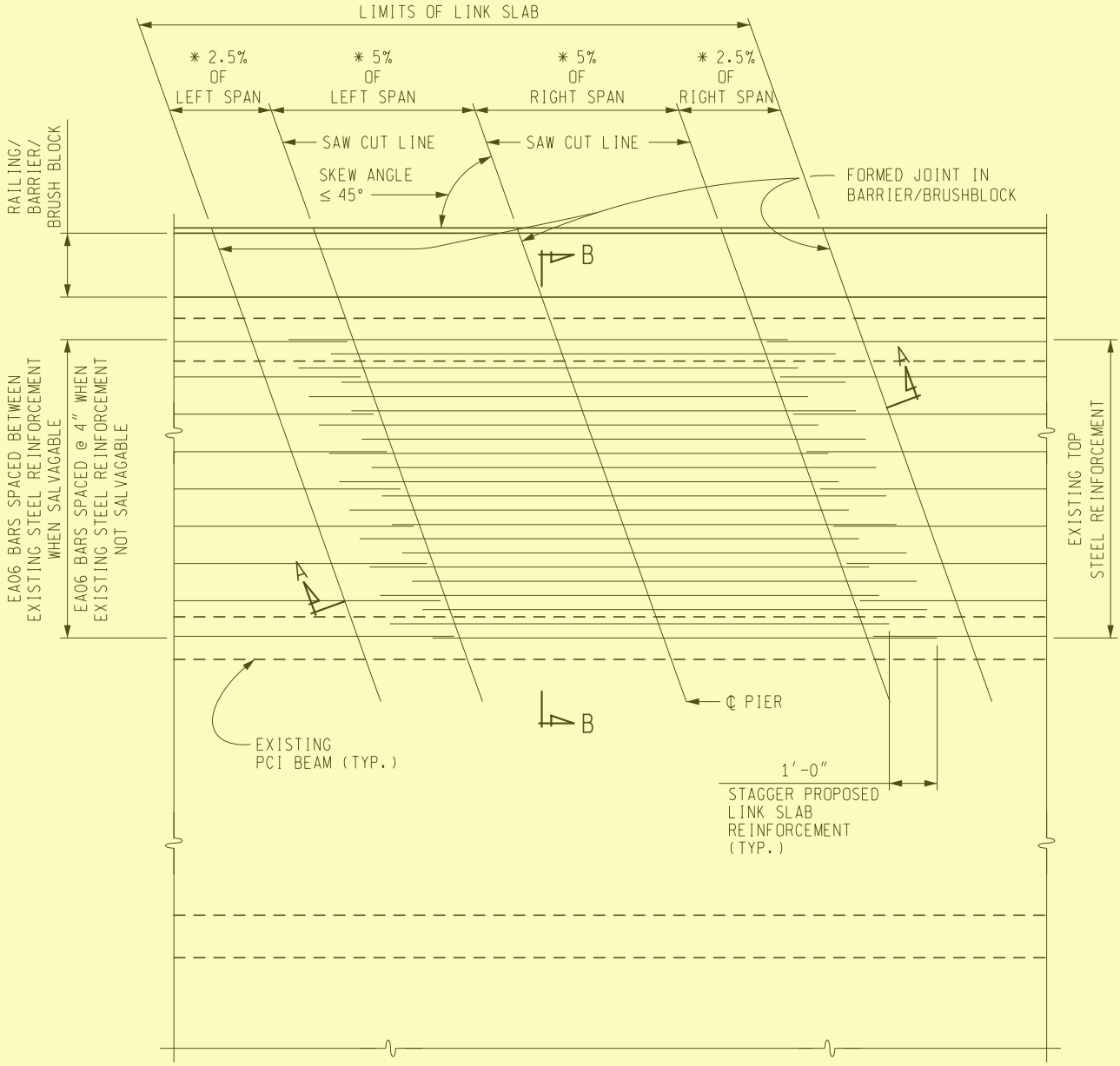
See Bridge Design Guides 6.44.01, & 01A.

CONTENTS

SECTION 6 - SUPERSTRUCTURE (cont)

DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: BMW	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT LINK SLAB DETAILS	ISSUED: 01/25/21 SUPERSEDES: / /



PARTIAL DECK PLAN AT PIER

(TRANSVERSE STEEL REINFORCEMENT IS NOT SHOWN)
(CONCRETE BEAM SHOWN STEEL BEAM SIMILAR)

NOTES:

USE LINK SLAB DETAILS WHEN SKEW ANGLE IS LESS THAN OR EQUAL TO 45°.

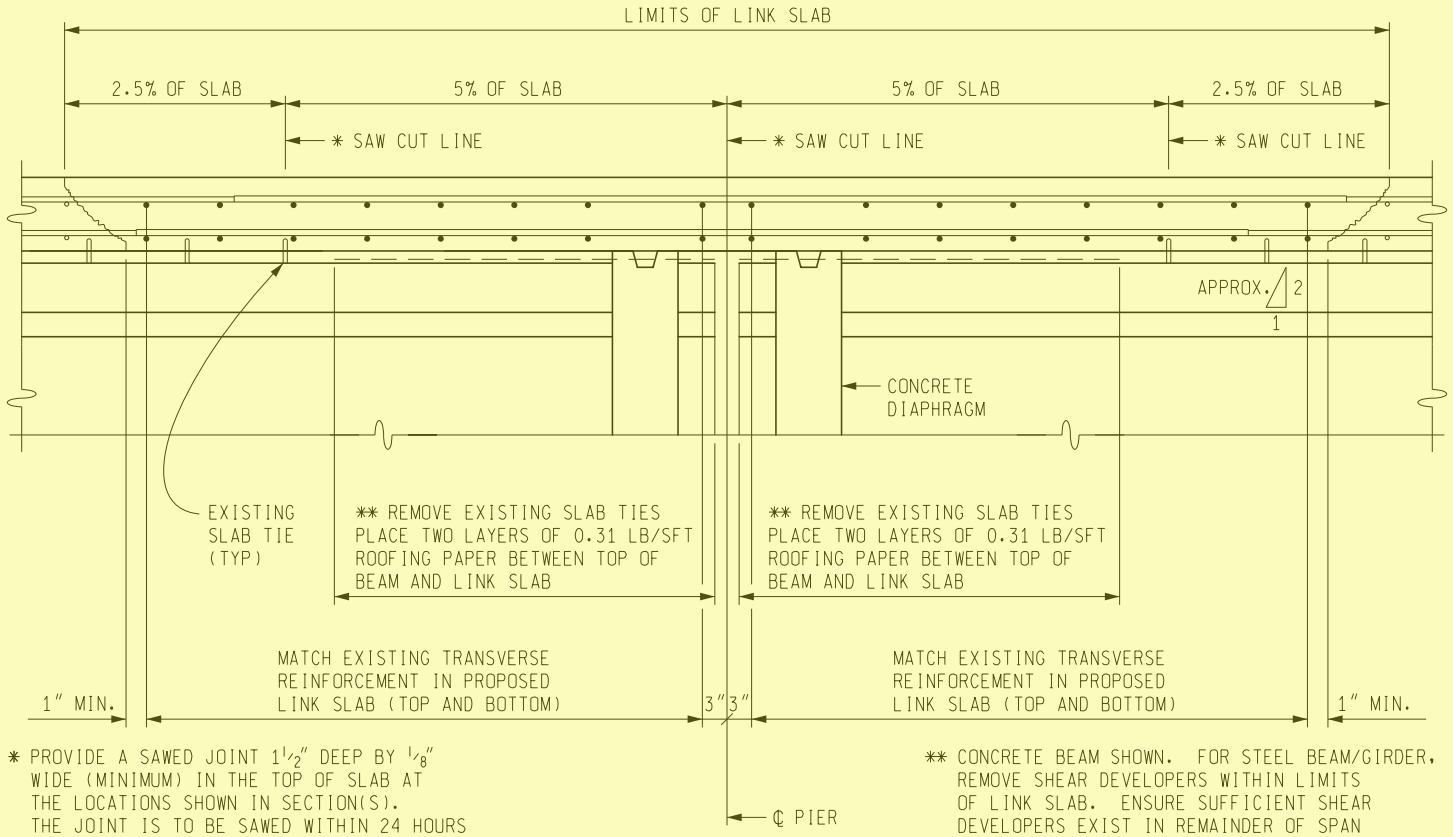
STEEL REINFORCEMENT FOR THE RAILING AND BRUSH BLOCK SHALL BE REPLACED IN KIND AS DIRECTED BY THE ENGINEER AND AS DETAILED ON THE PLANS.

ALL SAW CUTS FOR DECK, BRIDGE RAILING AND BRUSH BLOCK REMOVAL SHALL BE INCLUDED IN THE PAY ITEM "STRUCTURES, REHABILITATION, REM PORTIONS (STRUCTURE NO.)".

* 2.5% AND 5% OF PARTICULAR SPAN. SPAN LENGTHS CAN VARY AND RESULT IN DIFFERING LINK SLAB LENGTHS IN ADJOINING SPANS.

PREPARED BY DESIGN DIVISION	6.44.01

DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: BMW	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT LINK SLAB DETAILS	ISSUED: 01/25/21 SUPERSEDES: / /

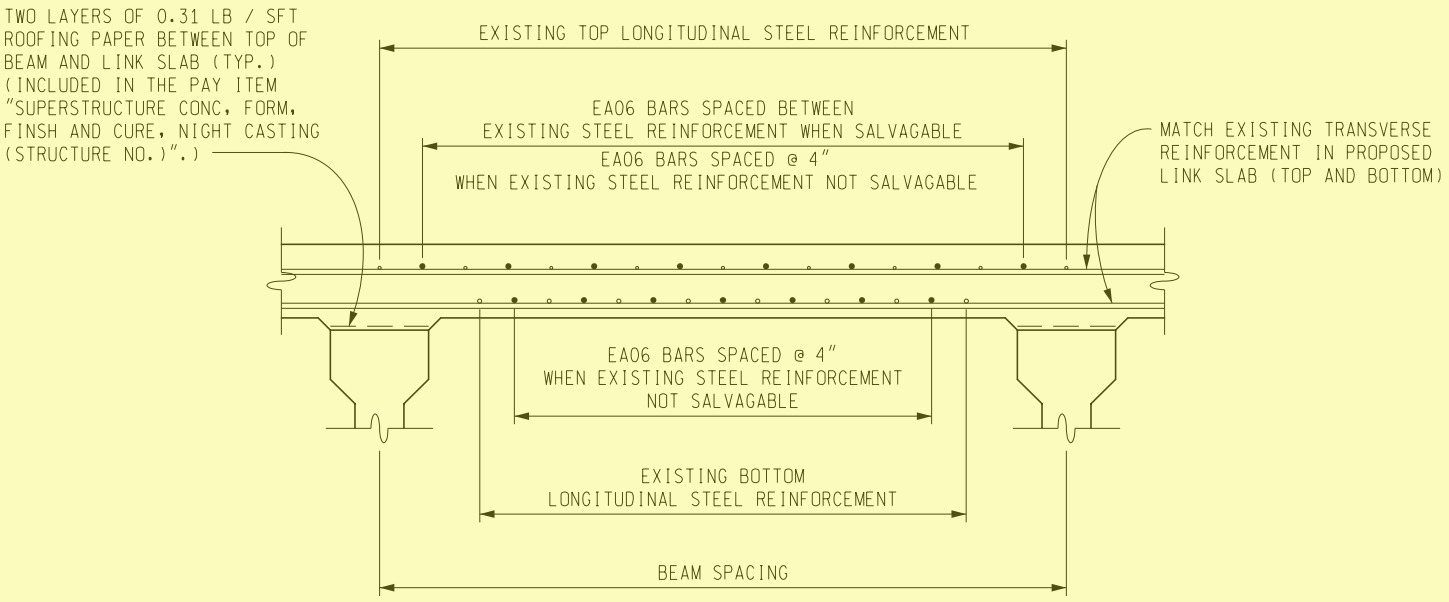


* PROVIDE A SAWED JOINT $1\frac{1}{2}$" DEEP BY $\frac{1}{8}$" WIDE (MINIMUM) IN THE TOP OF SLAB AT THE LOCATIONS SHOWN IN SECTION(S). THE JOINT IS TO BE SAWED WITHIN 24 HOURS OF PLACING THE CURING AND IS TO BE FILLED TO $\frac{1}{4}$" BELOW TOP OF CONCRETE WITH POLYURETHANE OR POLYURETHANE HYBRID SEALANT. (INCLUDED IN THE BID ITEM "SUPERSTRUCTURE CONC, FORM, FINISH, AND CURE, NIGHT CASTING (STRUCTURE NO.)").

** CONCRETE BEAM SHOWN. FOR STEEL BEAM/GIRDER, REMOVE SHEAR DEVELOPERS WITHIN LIMITS OF LINK SLAB. ENSURE SUFFICIENT SHEAR DEVELOPERS EXIST IN REMAINDER OF SPAN TO PROVIDE FOR HORIZONTAL SHEAR TRANSFER. IF REQUIRED, INCREASE DECK REMOVAL LIMITS TO PERMIT PLACEMENT OF ADDITIONAL SHEAR DEVELOPERS BEYOND THE LINK SLAB.

SECTION A-A

(CONCRETE BEAM SHOWN STEEL BEAM SIMILAR)

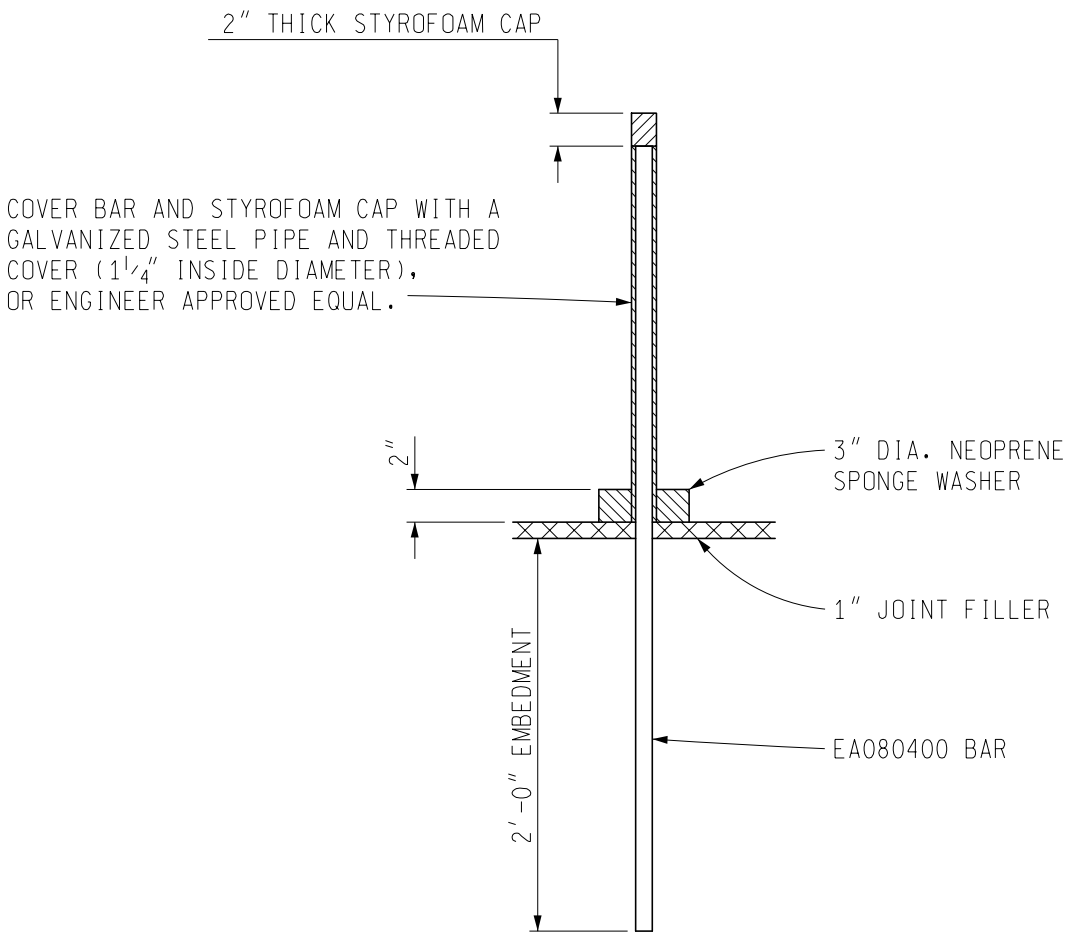


SECTION B-B

(CONCRETE BEAM SHOWN STEEL BEAM SIMILAR)

PREPARED BY DESIGN DIVISION	6.44.01A

DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: BMW	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT PIER DIAPHRAGMS FOR PRESTRESSED CONCRETE BEAMS CONTINUOUS FOR LIVE LOAD	ISSUED: 01/25/21 SUPERSEDES: 07/18/16



DETAIL B

ALL WORK AND MATERIAL FOR THE STYROFOAM CAP, METAL SLEEVE AND NEOPRENE SPONGE WASHER SHALL BE INCLUDED IN THE BID ITEM "SUPERSTRUCTURE CONC, NIGHT CASTING."

PLAN NOTES:

BLOCK OUT CONCRETE AT ELASTOMERIC BEARINGS. ATTACH NO. 30 ASPHALT FELT WITH ROOFING TAR/ASPHALT TO SIDES OF BEAMS FROM BEAM END TO 1" PAST EDGE OF PIER DIAPHRAGM. REMOVE 1" EXCESS ON OUTSIDE OF FASCIA BEAMS AFTER DIAPHRAGM FORM REMOVAL. ALL LABOR, MATERIALS AND CLEANUP/REMOVAL ARE INCLUDED IN THE BID ITEM "SUPERSTRUCTURE CONC, NIGHT CASTING."

JOINT BETWEEN BEAM ENDS SHALL BE FILLED WITH CONCRETE.

PROVIDE A SAWED JOINT 1 1/2" DEEP BY 1/8" WIDE (MINIMUM) IN THE TOP OF SLAB AT THE LOCATIONS SHOWN IN SECTION(S). THE JOINT IS TO BE SAWED WITHIN 24 HOURS OF PLACING THE CURING AND IS TO BE FILLED TO 1/4" BELOW TOP OF CONCRETE WITH POLYURETHANE OR POLYURETHANE HYBRID SEALANT. (INCLUDED IN THE BID ITEM "SUPERSTRUCTURE CONC, FORM, FINISH, AND CURE, NIGHT CASTING (STRUCTURE NO.)").